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FOREST INSECT INJURY IN THE ANTELOPE PLANTATION

The Antelope plantation, situated on the slopes of Antelope Mountain in the east side type of the Lassen National Forest, is the result of one of the more ambitious attempts at reforestation of burned over areas in California. The older portions of this plantation have shown excellent growth and trees are to be found up to 12 feet in height.

Little attention has been given to insect attacks on forest plantations in California. During this past season, however, reports have been received of tip moth injury in the Sugar Hill plantation in the Modoc National Forest and, although it was not possible to examine that plantation thoroughly, it was considered advisable to catalogue the amounts and types of injury caused by forest insects in the Antelope area, which was available for examination. This work was done in conjunction with similar examinations of reproduction and pole infestations as part of the cutover survey of 1934.

The plantations are of mixed ponderosa and jeffrey pine. All insect species noted attacked both species of trees with little apparent selection. Three plots were examined intensively for injury. All are situated on the lower slopes of Antelope Mountain; two are plantations in fairly deep soil of volcanic origin, and the third is in a rocky area having a shallow covering of the same type of soil.

INSECT SPECIES CONCERNED

Tip Moth.-

The tip moth (Rhyacionia pasadenana (Kearf.)) which has been found abundant in reproduction of other east side type areas and which has been reported as causing considerable damage to the Sugar Hill Plantation in the Modoc National Forest was present in limited amounts in the Antelope Plantation.

This species, which apparently has but one generation per year, attacks the buds and new growth of ponderosa pine and jeffrey pine reproduction that is less than 6 feet in height. Both terminals and primary lateral shoots are attacked. Buds are hollowed out and the shoot is mined for a distance of as much as three inches from the bud. Apparently there is some migration from bud to bud and one individual may destroy several buds. When attacks are heavy the trees are stunted in appearance, growth is reduced and, when terminals are attacked, the injury results in a major type of malformation. Occasional attacks to lateral buds are of secondary importance but killing of a terminal shoot is considered an injury of primary importance.

Dominant reproduction up to six feet in height and growing alone in sunny locations appears to be preferred. Little injury has been found in close growing clumps of reproduction, although the insect has been noted as present in such groups, in shade and on reproduction up to 12 feet

in height.

Shoot Moth.-

This insect, (Lepidoptera), which was found for the first time this season as an important pest in some cutover areas of the Lassen National Forest has not yet been identified. Although larvae were placed in rearing no adults have been secured.

The terminal and lateral shoots of the current year's growth are attacked above the last whorl of branches and while the new growth is still soft. The larva bores through the pith and usually kills the terminal or lateral shoot, although some have been found in which the larva apparently was successful but the shoot was not killed. Ordinarily the larva migrates from the infested shoot before it has completely faded. This species apparently prefers larger sized trees on this plantation and attacks very vigorous shoots.

Injury by this species to terminals is considered a primary injury, but except for the death of the infested portion attacks in lateral shoots are of secondary importance.

Pine Pampilid.-

Considerable defoliation by a Pamphilid (Hymenoptera) larva, probably a species of Itycorsia, was found on the plantation plots. Although rearing was attempted no adults were secured.

This insect webs the needles of a branch together and eats the foliage much as do other sawfly larvae. Although some frass is held in the web, no large mass is formed, as is the case with some other species. Injury caused by this species of insect is entirely secondary, at least in the amounts in which it has been found to date.

Sheath moth.-

This species, adult females of which were reared from material collected in the plantation, has been determined by Mr. Busck of the U.S. National Museum as Zelleria haimbachi Busck. The same species has been found abundant on other plot areas in the east side Lassen and Plumas National Forests.

This insect forms light webs among the needles and works under the protection of this web. The larvae mine the bases of the needles within the needle sheaths, finally cutting them completely off. However, the needles are held in place by the web and do not fall. The effects of this work are similar to those of partial defoliation and are entirely secondary in importance.

Pitch moth.-

One adult, tentatively determined by Mr. Heinrich of the U. S. National Museum as Dioryctria, probably ponderosae Dyar, was reared from pitch masses taken from trees in this plantation. The type of injury caused by this species was not abundant in the area.

CHARACTERISTICS OF THE INFESTATIONS

The following table shows the incidence of primary and secondary injury to the trees on the three plots, as well as the incidence in the several height classes represented on the plots. The figures are given in percent of total number of trees in each class:

PLOT #1

Tree Height	No. Trees	Healthy	Infested Primary	Infested Secondary
0'-2'	43	48.8	0.0	51.2
2'-4'	111	22.5	0.0	77.5
4'-6'	60	3.3	3.3	93.4
6'-8'	30	6.7	0.0	93.3
8'-10'	1	0.0	0.0	100.0
10'-12'	0			
TOTAL #Trees	254			

PLOT #2

0'-2'	5	100.0	0.0	0.0
2'-4'	11	72.7	0.0	27.3
4'-6'	36	63.9	5.5	30.6
6'-8'	20	45.0	10.0	45.0
8'-10'	18	44.4	5.6	50.0
10'-12'	0			
TOTAL # Trees	90			

PLOT #3

0'-2'	3	66.7	0.0	33.3
2'-4'	48	83.3	4.2	12.5
4'-6'	114	67.5	8.8	23.7
6'-8'	128	71.9	4.7	23.4
8'-10'	71	64.8	7.0	28.2
10'-12'	30	46.7	6.6	46.7
TOTAL # Trees	394			

Secondary injury was the result of attacks by the pine pamphilid, sheath moth, shoot moth and bud moth, in order of importance, the most important species being the first two named above. The primary injury was caused chiefly by the shoot moth, tip moth and mechanical injury due to browsing, snow break and similar types of injury.

It is to be noted that the larger the tree size the ~~higher~~ lower the incidence of complete health. This is ~~not~~ a natural condition due to the increase in abundance of material available for attack, with increase in size. Injury of primary importance appears to be greater in those plots in which the larger sized trees are the more abundant.

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K. A. SILMAN
Associate Entomologist